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CCLXXXIX.—FOOD GRAINS OF INDIA—*continued.**

Kangra Buckwheat.

(*Fagopyrum tataricum*, Gærtn., var. *himalaica*, Batalin.)

In the *Kew Bulletin*, 1891, p. 244, a short note, with an extract from a letter from Mr. J. F. Duthie, F.L.S., Director of the Botanical Department, Northern India, was published respecting a kind of buckwheat, of which a sample was sent from Saharunpur to St. Petersburgh in 1878, and which was believed by Dr. Batalin to be a new variety of *Fagopyrum tataricum*. It had seeds easily lossened from the pericarp, and it was thought that it might be advantageously used for the preparation of groats. The first supply of seed sent to Kew by Mr. Duthie in 1878 failed to germinate. A further supply was received from Dr. Batalin, Director of the Imperial Botanic Gardens, in August 1892, while in September 1892, Mr. Duthie sent more seed, and a set of specimens of the plant for the herbarium. Plants were raised from these seeds at Kew, and the fruit was ripened under glass in November last.

The typical plant (*Fagopyrum tataricum*, Gærtn.) is cultivated throughout the higher Himalayas, but more especially on the western extremity, and at altitudes from 8,000 to 14,000 feet. It is a taller, much coarser plant than *F. esculentum*, and the nuts, which are long, and not triangular, have the angles rounded off, and keeled towards the top. This, according to Watt's *Dictionary of the Economic Products of India*, iii., 312, is the buckwheat grown in Ladak, Zanskar, and Western Tibet. In the neighbourhood of Simla it is never seen below 9,000 feet. Dr. Aitchison states that the leaves are much used as a pot-herb in summer when other green food is not easily obtained.

The Kangra buckwheat (*Fagopyrum tataricum*, var. *himalaica*, Batalin), may be described as having the leaves and foliage of the type, but with the nut obscurely trigonous, the pericarp nearly black, smooth, very thin, splitting irregularly and easily removed

* For previous articles see *Kew Bulletin*, 1887, December, p. 7; 1888, p. 266; 1889, p. 283.

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from the seed. It is stated by Mr. Duthie to be grown as a hill-crop in Kulu. The first sample of seed sent to Kew "was from a place on the Punjab Himalaya above Kangra." When first examined by Dr. Batalin at Petersburgh, he was struck with the looseness of the pericarp, and the ease with which it could be separated from the seeds. On this account he regarded the plant as likely to be useful for cultivation in Europe, where, hitherto, it was not known. The experience with it in Russia, so far, has not borne out this anticipation. In a letter received from Dr. Batalin, dated the 30th July last, he states, "as "to the result of the cultivation of this *Fagopyrum*, I have noticed "that the plants grow very vigorously, and produce an abundance of "leaves, but [in this country, at least] the quantity of seeds harvested "from them is extraordinarily small, and I do not believe the "[Kangra] variety to be valuable enough for general cultivation in "Russia." We do not possess any data for estimating the yield in India, but as regards the value of the seeds as an article of food there can be little doubt that they are singularly rich in nutrient constituents. A sample of this buckwheat was communicated to Professor Church, F.R.S., who has long been engaged on a detailed inquiry into the food grains of India, and he has been good enough to furnish the following particulars:—

Kangra Buckwheat.

Mr. J. F. Duthie forwarded to me from Saharunpur, under date of November 21, 1891, a sample of buckwheat. It was thus labelled: "*Fagopyrum tataricum*, variety not yet described, grown as a hill-crop "in Kulu."

This sample contained about 8 per cent. of the fruits of the ordinary form of *F. tataricum*; these were removed, being easily picked out owing to their wide divergence in colour, texture, and form, from the very characteristic fruits of the new variety which constituted the bulk of the sample.

In these fruits the pericarp is smooth, dark coloured, tripartite, invariably dehiscent, and it does not entirely cover the ripe seed; it is, moreover, flexible and easily removed. Another character in which the pericarp of the new variety differs from that of the typical *F. tataricum* is its relatively small proportion by weight. Thus 100 fruits, weighing 21½ grains, yield no more than 14 grains of husks against more than twice that amount obtained from the same weight of fruits of the typical form.

The seeds of this buckwheat, after separation of the husk, gave, on analysis, the following results in 100 parts:—

Water	14·2
Albuminoids	12·7
Starch, &c., by difference	67·8
Oil	3·1
Fibre	0·7
Ash	1·5

It should be stated that the above per-centage of albuminoids has been calculated on the usual supposition that the whole of the nitrogen present in the seeds exists in the albuminoid form. But the coagulable albuminoids, as estimated by the "phenol method," amount to 11·2 per cent. only, a difference which is by no means an unusual one: the ratio of albuminoids to carbohydrates plus the starch-equivalent of the oil will then be 1 : 6¾ instead of 1 : 6. The nutrient value of these seeds is about 87.

In the absence of any complete analysis of other kinds of Indian buckwheat a comparative estimate of the alimentary value of these Kulu seeds cannot be made. But from the few data at my disposal I am inclined to consider this buckwheat as a particularly useful and valuable food grain. Its nutrient ratio is satisfactory; it contains a fair per-centage of oil or fat; the indigestible fibre is singularly low, being less than one part in 100. The small proportion of husk and the extreme ease with which it may be separated from the seed are strongly in its favour.

A. H. C.

Common Buckwheat.

(*Fagopyrum esculentum*, Mœnch.)

This is the common buckwheat or brank of Central Europe and Asia, where it is grown as a food crop. It is popularly regarded as greatly inferior to wheat in nutritious properties, but to be superior to rice. In India it is extensively cultivated from Western Tibet to Sikkim, the Khasia Hills, Manipur, and the Nilghiri Hills. Watt's *Dictionary of the Economic Products of India*, iii., 311, gives the analysis of a common buckwheat made by Professor Church, F.R.S., but not of Indian origin. At the time of the publication of the *Food Grains of India* in 1886, no authentic sample of Indian buckwheat had been communicated to Professor Church. This deficiency he has now been able to supply, as a sample reached him from India early in the present year. The results are as follows:—

Common Indian Buckwheat.

I find that I can now give the numbers obtained on the analysis of a sample of Indian-grown buckwheat of the ordinary kind received from Mr. Duthie early in the present year. 100 of the fruits weighed 30 grains. The husk amounted to 18 per cent. by weight.

Composition of Buckwheat (husked).

Water	13·3 per cent.
Albuminoids	14·2 „
Starch	66·6 „
Oil	2·0 „
Fibre	1·9 „
Ash	2·0 „

The nutrient ratio is here 1:5, but when the albuminoids were determined by the phenol method this ratio becomes 1 : 5$\frac{4}{5}$, for the per-centage of albuminoids was reduced to 12·4. The nutrient value is 85·4.

On comparing the above per-centages with those previously given for the variety *himalaica* of *F. tataricum* it will be noted that while the total nutrient value of the latter is higher, its proportion of albuminoids is lower. But, on the other hand, the presence of a smaller quantity of fibre, and of a larger quantity of oil, in the new variety, tells in its favour.

12th December 1892. A. H. C.

CCXC.—NEW ORCHIDS: DECADE 4.

31. **Pleurothallis rhombipetala**, *Rolfe;* caulibus gracilibus, foliis elliptico-oblongis subobtusis minutissime tridenticulatis basi attenuatis, pedunculis gracilibus elongatis laxifloris, bracteis spathaceis oblongo-lanceolatis acutis, pedicellis gracilibus, sepalo postico lanceolato acuto carinato, lateralibus omnino connatis lanceolato-linearibus acutis cucullatis bicarinatis basi latis, petalis carnosis spathulato-rhomboideis obscure trilobis, labello recurvo carnoso lineari subobtuso cucullato-canaliculato, columna clavata marginata apice tridenticulata.

Hab. Venezuela, Mt. Roraima.

Caules breves. *Folia* 3½ poll. longa, 1¼ poll. lata. *Pedunculi* 4–7 poll. longi. *Bracteæ* 2–3 lin. longæ. *Pedicelli* 6–8 lin. longi. *Sepala* 4–5 lin. longa. *Petala* et *labellum* 1 lin. longa.

This species is nearly allied to the Brazilian *P. arcuata*, Lindl., which has rather larger flowers, and the tips of the lateral sepals free. It was imported from Mount Roraima, by Messrs. Charlesworth, Shuttleworth & Co., of Clapham, and flowered in their establishment last December. The sepals are a very pale green, the dorsal one thickly spotted with dull purple, the fleshy petals dull maroon-purple, the lip palest green with a few dark purple spots on the margin, and the column blotched with dull maroon on a lighter ground.

32. **Brachionidium Sherringii**, *Rolfe;* caule primario scandente radicante, secundario brevi spathaceo-vaginato monophyllo, foliis elliptico-lanceolatis v. ovato-oblongis apiculatis, pedunculis gracilibus unifloris, bracteis basi infundibuliformi-spathaceis apice setaceo-acuminatis, sepalo postico ovato longe setaceo-acuminato, lateralibus connatis similibus apice breviter bifidis, petalis sepalo postico similibus margine minutissime denticulatis, labello brevissimo trilobo, lobis rotundatis, disco medio obtuse calloso-carinato, columna brevissima brachiis falcato-ovatis acutis, pollinibus 6 clavato-linearibus basi cohærentibus.

Hab. W. Indies, Id. of Grenada, top of Fedon's Camp, at 2,400 ft. elevation; *R. V. Sherring!*

Caules primarii elongati, secundarii 3–6 lin. longi. *Folia* 8–15 lin. longa, 2–6 lin. lata. *Pedunculi* 1¼–1½ lin. longi. *Bracteæ* 1–1½ lin. longæ. *Sepala* et *petala* 7–8 lin. longa, basi 1½–2 lin. latæ. *Labellum* ¾ lin. longum.

An interesting addition to the genus, and quite distinct from the three Andine species hitherto described. Mr. Sherring found it "growing "on a tree fully exposed to the sun, and all the force of the wind on the "ridge on top of Fedon's Camp, at 2,400 feet elevation." The structure of the pollinia of this genus has not yet been recorded. In the present species they are clavate-linear in shape, six in number, and slightly united at the slender base by a little viscid matter. The lip is delicately articulated to the column, another point left doubtful by Bentham. These facts both confirm the distinctness of the genus, and its position in the group *Pleurothalleæ*.

33. **Bulbophyllum sanderianum**, *Rolfe;* pseudobulbis brevibus tetragonis monophyllis, foliis sessilibus elliptico-oblongis subobtusis carnosis, scapis suberectis arcuatis multifloris, bracteis oblongis acutis, sepalis triangulari-ovatis acuminatis rigidis, petalis triangulari-ovatis acutis ciliatis, labello recurvo oblongo crasso-carnoso basi auriculato, auriculis suborbicularibus carnosis, disco carinato carina elevata truncata, columna brevissima quadridentata dentibus inæqualibus gracilibus.

Hab. N.E. Brazil, prov. Pernambuco.

Pseudobulbi ¾–1 poll. lati. *Folia* 2½ poll. longa, 1½ poll. lata. *Scapi* 1⅓ ped. longi. *Bracteæ* 3 lin. longæ. *Sepala* 4½–5 lin. longa. *Petala* 1½ lin. longa. *Labellum* 2 lin. longum. *Columna* ¾ lin. longa; dentes terminales ¾ lin. longæ, laterales multo breviores.

This species was introduced from the province of Pernambuco, N.E. Brazil, together with *Cattleya labiata* and other Orchids, by Messrs. F. Sander & Co., of St. Albans, with whom it flowered last July. It is allied to *B. meridense*, Rchb. f., and *B. geraense*, Rchb. f. The sepals are very pale green, with numerous small brown spots. The ciliate petals are white, with a few purple spots and a purple margin. The lip is deep purple-brown, with some green near the apex of the side lobes, and with a tuft of long hairs at the apex of the front lobe, and a deep fleshy keel which is truncate in front. The column is white, spotted with purple in front, and the anther-case yellow and green. Messrs. F. Sander & Co. have just presented a plant of this species to Kew.

34. **Bulbophyllum vitiense**, *Rolfe;* rhizomate repente, pseudobulbis subdistantibus tetragonis monophyllis, foliis lineari-oblongis subacutis basi attenuatis, racemis suberectis multifloris, bracteis lanceolatis acutis, floribus pendulis, sepalis æqualibus lanceolato-linearibus acuminatis, petalis oblanceolatis acutis minutissime denticulatis, labello recurvo lineari-oblongo subobtuso ciliato medio minutissime canaliculato, columna brevissima alis subulatis columnæ fere æqualibus.

Hab. Fiji, Botanical Station, *Yeoward!*

Pseudobulbi 1–1¼ poll. longi, 9–10 lin. lati. *Folia* 5–7 poll. longa, 9–14 lin. lata. *Racemi* 6–7 poll. longi. *Bracteæ* 2 lin. longæ. *Sepala* 6–7 lin. longa. *Petala* 1½ lin. longa. *Labellum* 1½ lin. longum.

This species was sent to Kew from the Botanical Station, Fiji, by Mr. Daniel Yeoward, and flowered in the collection in August 1892. It is very distinct from *B. rostriceps*, Rchb. f., which appears to be the only species hitherto described from Fiji. Until the species of this large and difficult genus are arranged in better order than at present, it is difficult to point out its exact affinities. The flowers are of a very pale yellowish white, with the upper half of the sepals light pink.

35. **Megaclinium minutum**, *Rolfe;* pseudobulbis approximatis ovoideo-oblongis obscure trigonis diphyllis, foliis lineari-oblongis obtusis v. minute bidentatis, scapo brevi suberecto, rachi oblongo crenulato minute lepidoto circa 12-floro, bracteis reflexis triangulis acutis, floribus carnosis, ovario ferrugineo-pubescente, sepalo postico oblongo obtuso, lateralibus oblique ovatis acutis apice reflexis, petalis lanceolato-subulatis acuminatis, labello cordato-ovato obtuso apice reflexo disco lævi, columna brevissima alis minutis late oblongis subobtusis.

Hab. W. Africa, top of Sugarloaf, Sierra Leone, about 3,000 ft. elevation; *G. F. Scott Elliot!*

Pseudobulbi ½–1¼ poll. longi, 3–4 lin. lati. *Folia* ¼–1 poll. longa, 1½–2½ lin. lata. *Rachis* 1 poll. longa, 2½ lin. lata. *Bracteæ* 1 lin. longæ. *Sepalum* posticum 1¼ lin. longum; lateralia breviora. *Petala* et *labellum* minuta.

A minute species, by far the smallest known, which was sent home by G. F. Scott Elliot, Esq., naturalist to the recent Sierra Leone Delimitation Commission, and flowered in the Kew collection last August. The flowers are dull maroon, with the petals and the base of the dorsal sepal light greenish, the base of the lip pale yellow, and the

column light yellow with light maroon wings. The rachis is purple-brown.

36. Phaius roseus, *Rolfe ;* foliis elliptico-lanceolatis acuminatis petiolatis, scapis foliis paullo longioribus, bracteis lanceolato-oblongis acutis cucullatis deciduis, sepalis lanceolato-oblongis subacutis lateralibus carinatis, petalis lanceolato-linearibus paullo undulatis, labello columnam involvente trilobo, lobis lateralibus late rotundatis, intermedio latissime obcordato-oblongo, disco carinato carina obtusa carnosa hirsuta apice unidentata, calcare elongato apice minute bidentato, columna clavata.

Hab. W. Trop. Africa ?

Folia circa 1 ped. longa, 3 poll. lata. *Scapus* circa $1\frac{1}{4}$ ped. altus, 6-florus. *Bracteæ* 10 lin. longæ. *Pedicelli* $1\frac{1}{4}$ poll. longi. *Sepala* 14 lin. longa, $4\frac{1}{2}$ lin. lata. *Petala* 14 lin. longa, $2\frac{1}{2}$ lin. lata. *Labellum* petalis æquale ; calcar 8 lin. longum. *Columna* 9 lin. longa.

This very distinct *Phaius* was collected by the Right Hon. the Earl of Scarborough. The habitat is not absolutely known, but it is supposed to be West Tropical Africa. It flowered in Lord Scarborough's collection in December last, and was sent to Kew for determination. The flowers are of a delicate light rose shade, the lip somewhat marbled with white spots, the disc with a white hairy fleshy keel and a minute tooth at the apex, and the spur deep yellow. In fading the flowers pass to a light orange-buff shade. It would be the second species discovered in Western Africa.

37. Pholidota Lugardi, *Rolfe ;* pseudobulbis articulatis subcylindricis demum sulcatis diphyllis, foliis elliptico-oblongis obtusis basi attenuatis, racemis arcuato-pendulis flexuosis multifloris, floribus distichis v. subsecundis, bracteis concavis v. conduplicatis elliptico-ovatis subacutis, sepalis concavis elliptico-oblongis subobtusis, lateralibus carinatis, petalis elliptico-oblongis subacutis sepalis paullo minoribus, labello cymbiformi intus quinque-lamellato apice biauriculato auriculis suborbicularibus, columna clavato-oblonga marginata apice minutissime denticulata.

Hab. Western Burma, Chin Hills, at 6,000–8,000 ft. elevation ; *Lugard !*

Pseudobulbi $2\frac{1}{2}$–5 poll. longi, 5–8 lin. lati. *Folia* 4–7 poll. longa, $1\frac{1}{2}$–$2\frac{1}{4}$ poll. lata. *Racemi* 3–4 poll. longi. *Bracteæ* 9–11 lin. longæ. *Flores* 4–5 lin. longi.

This species is allied to *P. articulata*, Lindl., but is altogether a more robust plant, more erect in habit, and larger in all its parts. The sepals and petals are semi-pellucid white, and the sac of the lip pale flesh-coloured, the keels unequal, and buff-coloured, and the base of the auricles deep yellow. It flowered in the collection of Sir John Kirk, of Wavertree, Sevenoaks, in June 1890, when he forwarded it to Kew for determination, together with a living plant, which has since flowered. It is one of a large collection made by Captain Lugard in the above-named locality.

38. Epidendrum (§ *Barkeria*) Palmeri, *Rolfe ;* pseudobulbis fusiformibus di-triphyllis, foliis linearibus v. lineari-lanceolatis acutis, pedunculis terminalibus, racemis simplex v. interdum ramosis multifloris, bracteis lanceolatis acuminatis, pedicellis gracilibus, sepalis linearilanceolatis acuminatis, petalis lanceolatis acutis, labello suborbiculari-elliptico obtuso irregulariter crenulato, carinis 3 approximatis parallelibus crenulato-papillosis, nervis lateralibus basi elevatis crenulato-papillosis, columna brevi clinandrio late alato.

Hab. Mexico, Colima ; *Palmer*, Jan.–Feb. 1891, n. 1201 !

Pseudobulbi 1–3 poll. longi. *Folia* 1½–2½ poll. longa. *Pedunculi* ⅓–1 ped. longi. *Bracteæ* 1½–3 lin. longæ. *Pedicelli* 5–8 lin. longi. *Sepala* 7 lin. longa, 1½ lin. lata. *Petala* 7 lin. longa, 2 lin. lata. *Labellum* 7 lin. longum, 5½ lin. latum. *Columna* 1 lin. longa.

A very distinct Epidendrum, belonging to the section *Barkeria*, readily distinguished from every other by its narrow leaves, small bracts, and smaller flowers, which are densely arranged on the raceme, and appear to be light rosy purple in colour. A dried specimen collected by Dr. Edward Palmer, at Colima, in Mexico, was sent for determination by Mr. J. N. Rose, Assistant Botanist, Department of Agriculture, Washington, U.S.A., in November 1892.

39. **Sarcochilus muscosus**, *Rolfe;* caulibus nanis, foliis distichis lineari-oblongis apice inæqualiter bidentatis, scapis brevibus muscoso-hispidis paucifloris, floribus heterochronicis fugaceis, bracteis squarrosis oblongo-ovatis subobtusis apice recurvis, sepalis patentibus elliptico-oblongis acutis, lateralibus ad pedem columnæ adnatis, petalis elliptico-oblanceolatis subacutis, labello ad pedem columnæ articulato trilobo, lobis lateralibus late oblongis obtusis, intermedio late trulliformi-triangulo subobtuso angulis lateralibus paullo elongatis, sacco oblongo, columna clavata.

Hab. Andaman Islands, *Man!*

Folia 2½–3 poll. longa, 6–7 poll. lata. *Scapi* 1½–1¾ poll. longi. *Bracteæ* 1 lin. longæ. *Sepala* 3 lin. longa, *Petala* paullo minora. *Labellum* 2 lin. longum, 2¾ lin. latum; saccus 1½ lin. longus. *Columna* 1½ lin. longa.

This species was sent from the Andaman Islands, together with *Phalænopsis tetraspis*, Rchb. f., by E. H. Man, Esq., and flowered in the Kew collection last November. It is allied to *S. hirtulus*, Hook. f. (Hooker's *Ic. Pl.*, t. 2121), which has longer, acuminate leaves, falcate side lobes to the lip, and the front lobe divided into two falcate spreading divisions, closely resembling the lateral lobes in appearance. *S. muscosus* has dull yellow flowers, with red-brown spots on the base of the sepals and petals, a white lip with a few small purple spots and streaks round the mouth of the sac, which organ is light yellow at the tip, and a light yellow column, the foot of which is spotted and streaked with red-brown on a dull yellow ground.

40. **Pelexia maculata**, *Rolfe;* foliis petiolatis concavis ovatis acutis, scapo 1 ped. alto, vaginato pubescente, racemo multifloro, bracteis lineari-lanceolatis acuminatis concavis, ovario pubescente, sepalis pubescentibus, lateralibus lanceolato-linearibus acutis basi in appendicem calcariformem ovario fere omnino connatam productis, postico oblongo-lanceolato obtuso, petalis cum sepalo postico in galeam conniventibus spathulato-lanceolatis subobtusis subobliquis, labelli ungue cum columna in tubum connivente, limbo reflexo late ovato obtuso margine subinvoluto, disco convexo basi breviter bicarinato, columna elongata rostello subulato-lineari.

Hab. not recorded.

Folia 2½–4 poll. longa, 1½–2½ poll. lata. *Scapus* 1 ped. altus. *Bracteæ* ¾–1 poll. longæ. *Sepala* 5–6 lin. longa, lateralia in appendicem calcariformem 5 lin. longum producta. *Labelli* unguis 4 lin. longus, limbus 1½ lin. longus. *Columna* 4 lin. longa; rostellum 1 lin. longum.

A very distinct species with leaves shining olive-green and irregularly blotched with pale whitish green on the upper surface, and dull purplish grey below. The entire scape, including the bracts and sheaths, is

light pinkish brown, and the flowers pale dull green with a little pink at the tips of the sepals and petals, and a white lip. It flowered in the Glasnevin Botanic Garden in July 1892, and was sent to Kew for determination by Mr. F. W. Moore, the Keeper. A plant is in the Kew collection, which was presented by Messrs. Hugh Low & Co., of Clapton. Its habitat is not recorded.

CCXCI.—FRUIT GROWING AT THE CAPE.

The following interesting reports upon fruit growing at the Cape of Good Hope have been communicated to Kew for publication in the *Kew Bulletin*. The first report by Professor MacOwan, F.L.S., deals with the fruit production in the Western Province of the Cape; while that by Mr. William Tuck deals with the fruit production in the Eastern Province. Both these reports should be read in conjunction with the general information respecting Cape fruits, published in the *Kew Bulletin*, 1888, p. 15 :—

Fruit Production in the Western Province of the Cape.

The advantage which the Cape possesses for fruit supply to European markets is primarily due to the seasons coming conversely.

This is best seen in a simple tabular arrangement :—

Cape.			Europe.
December, January, February	- -	Summer - -	June, July, August
March, April, May	- -	Autumn - -	September, October, November
June, July, August	- -	Winter - -	December, January, February
September, October, November	- -	Spring - -	March, April, May

Besides this general statement it must be remembered that the seasons on the two sides of the Colony, west and east, are differentiated much as are those of India, by the rainfall occurring conversely. In fact, the Cape is subject to monsoon conditions in this matter; the west having its rainfall maximum in winter, while the east has it in the warmer months, and, speaking generally, has two maxima, namely, the November or spring rains and the autumn rains in February. From these peculiarities arise important results in fruit growing. Of these the most striking is the limitation of profitable wine, grape, and raisin production to the Western Province, which possesses the necessary hot and dry summer for the proper ripening of the fruit of the vine. In the east, with frequent summer showers, and much heavy rain in February, viticulture is reduced to a branch of gardening, and only table grapes for local consumption, such as the Crystal and Sweet Water, can be successfully managed. This is a general statement, subject to a few exceptions dependent on local climatic conditions. Thus good results have been obtained in the somewhat intermediate Karoo, *e.g.*, at Graaf-Reinet and its neighbourhood. Still the rule holds good in a general

way, and a glance at Gamble's Diagrams of Rainfall, where the curve is plotted so as to make the data readily comparable by the eye, will enable one to say where viticulture on a large scale is climatically favoured and where it will present special difficulties. In the former case the rain curve for January, February, March keeps at or below 1 in., in the latter it runs up to the monthly maximum for the year, say 3·5 to 4 inches.

In western markets, January gives the last of the strawberries and apricots, grapes, pears, apples, according to kind, peaches, plums, and figs. The quality of fruit marketed is largely deteriorated by want of enterprise in arranging for its proper packing and transit. It is shaken down and tumbled into old gin cases and the like for jolting to market, hence it must be only three quarters ripe to bear the rough usage without being turned to unsaleable pulp. Grapes are sent by tolerably careful growers in small baskets and arrive fairly well. The ordinary small farmer is satisfied with piling the bunches loose in the back of his cart till he has perhaps a hundredweight or more, and this mass he hawks about town as if it could be called fruit for the table. Of late years a very few of the leading growers pack their choice fruit, after selection and grading to size, in baskets and boxes containing a given number according to name and sample. But this care is quite exceptional; and the average fruitist here has yet to learn the first principles of marketing his produce. I cannot more suggestively point out the crude conditions of supply than by quoting the common phrase among sellers that they "*spare*" the fruit to the customer.

In February the better sorts of apples, peaches, and nectarines are ripe. In this country it is only the *late* European varieties that are suitable for market supply on the large scale. Grapes and melons have now some flavour, unless they have been injudiciously spoiled by irrigation. In this month and in March begins the fruit-drying season, that is to say, fruit-drying in the sun, as opposed to fruit-evaporating, the more practical and manageable plan. Now, too, oranges begin to appear, at first very poor and about one-third ripe. The future supply of oranges at all resembling the fruit as marketed in Europe depends upon several conditions, only partially impressed on the Cape grower's mind. First, the need of *cultivating* his orange orchard instead of leaving it to chance. Second, maintaining a constant vigilance against scale and mealy-bug by oft-repeated spraying of insecticides. Third, selection of the very best sorts, say St. Michael, Bahia, Homosessa, and by budding or grafting, and no longer trusting to chance seedlings, which, four times out of five, throw back and give inferior fruit. Fourth, using Bigarrade stocks, in place of Lemon stocks, which are in fashion with nursery men as giving less trouble in the nursery stage.

In April there are still fine grapes, late apples and pears, the far too little regarded quince, lemons, oranges, and guavas. May shows an increasing supply of guavas, oranges of fair quality, and the Japanese loquat. The shaddock and pamplemousse generally appear in June. In fact it may be said that from June to well into October the citrus-fruits are the only fresh orchard produce. A few late pears may be seen, but, except in private gardens, there is little provision exercised to get a successional supply. Hence, on the market, it is always a feast or a fast. In October oranges are at their best and are perfectly ripe.

With November come in the earliest figs and the strawberry. Also the early black mulberry ripens, but is little sought after. Occasionally early apricots are fairly ripe before the month is out, but the best part

of the early stone fruit, except plums, waits for December and brings the cycle round again.

The antiquated, conservative ways of the Cape fruit farmers are due to several causes not far to seek. One of the chief is their comparatively isolated life and the absence of any effective interchange of ideas and information upon the subject of their industry. I have never yet found an ordinary Western Province market gardener who took in a gardening periodical or cared to learn what is being done in other countries. The desire to improve the output is materially checked by the immense demand for cheap coarse fruit among the coloured lower orders in Cape Town. So that the grapes are dirt cheap it does not matter to them how dirty they are, nor are they disgusted at seeing the same baskets that carried the grapes into town piled up among the stable manure the cart takes back to the farm in the afternoon. In no other public of fruit consumers is quality so little thought of, and hence the producer is satisfied to grow crops from seedling trees fit only for stocks. They sell somehow, so why should he trouble himself with any ambitious endeavour to produce a better article for which only the ruling price would be paid? Upon the very few enlightened men who grow fruit on European principles, of the best sorts and in the best manner, the stolid indifference of the market and its pernicious ring of half-coloured middlemen reacts with cruel force. They cannot somehow reach the educated purchaser, who wants fine and clean fruit, at its best maturity, fit for dessert. It is the same with the somewhat similar commodity, fish. We all have to be content with what suits the Malays, dispensed Malay fashion. Nor do I see how this vicious circle is to be broken, unless some enterprising person with capital and sharp business capacity, shall start among us as purveyor, and by dint of superior and select produce beat the half-caste slovens out of their monopoly. The effort would be tedious; for the public, tired of opposing the passive resistance of the present dealers, are apathetic, and would certainly have to be waited on daily for orders. It might be possible to combine the fruit-drying and fruit-preserving industry associated with fruit export and daily supply to the very large local demand existing in Cape Town. I think that the four branches of industry might supplement each other, and fit into one another economically. Yet it is not done, and, so far as I know, has never been proposed.

P. Macowan, F.L.S.,
Government Botanist.

Cape Town, May 1892.

Fruit Growing in the Eastern Province of the Cape.

The following details have been obtained from Mr. William Tuck of Grahamstown, the most experienced fruit grower on the eastern frontier.

Grapes.—The Sunday River Valley is the only place in the Eastern Province, from the Addo upwards, where grapes can be grown fit for export. They will have to be attended to with the same technical skill as hot-house grapes receive, not left to chance, as seems to be the universal mode at present. By carelessness and want of proper thinning out, Cape grapes are generally good and large on the outside of the bunch, bad and not half grown or coloured in the middle. Special localities for growing will have to be selected by some person with local experience extending over a number of seasons. To set a new comer to pick out a

site for grape growing (or for any other growing) is about as wise as to toss up for selection. Eastern grapes of the kind cultivable and exportable will be fit for export 1st January to 1st May.

Apples.—Apples can be grown all through the Eastern Province, except in the belt about ten miles wide along the coast line, and inwards as far as the Colony extends. Early apples are not fit for export, and indeed are not suited to the Cape. The export may be from March to about May.

Pears.—Pears will answer well from the first plateau, that is the Grahamstown level (1,760 ft. alt.) inwards. Also, even below that, in detached localities. For instance, at Uitenhage they do well, though the altitude is under 200 ft. The export would be from March to June.

Apricots, Peaches, and Nectarines—may be classed in the same category. The apricots are ready from December to January, peaches in January, February, and March, and nectarines in the same three months. Export of apricots does not seem possible.

Plums—follow the same conditions as apples, but are more impatient of proximity to the sea. Their season will be from March to May.

Oranges—do not seem affected much by the coast conditions. There are very fine orange trees at about six miles from the sea, and they certainly do well from that line at least as far as the level of Somerset East (2,500 ft.) and perhaps higher still, beyond my experience.

The chief difficulty regarding fruit growing in the Eastern Province is presented by the parasitic fly, *Ceratitis*. We can never depend on any fruit, except grapes, coming to ripeness without fly-larvæ. Where, owing to high altitude, 2,000ft. to 3,000 ft. and over, there are sharp frosts every winter, such fruits as can stand the cold are fairly free from the plague; because the larvæ cannot tide over the frost. It sometimes happens that scarcely a peach ripens in the whole Province without a worm inside. Now if a general and perfect destruction of all the fruit grown in any one year could be brought about by the common consent of the whole body of fruit growers, the fly might be stamped out. But the universal system of go-as-you-please, added to the isolated life of Cape farms, renders any such united action of a year's self-denial for the common good quite impracticable.

William Tuck.

Grahamstown, 5th May 1892.

CCXCII.—DECADES KEWENSES.

Plantarum Novarum in Herbario Horti Regii Conservatarum.

DECAS IV.

31. **Sarcolæna codonochlamys,** *Baker* [Chlænaceæ]; ramulis apice pilosis, foliis breviter petiolatis oblongis rigide coriaceis obscure triplinerviis facie nitidis glabris dorso adpresse pubescentibus, floribus pluribus corymbosis pro genere magnis, pedicellis dense pilosis, involucro urceolato deorsum coriaceo-carnoso glabrato collo incurvato

ferrugineo-piloso, petali laminâ orbiculari, staminibus petalis æquilongis, stylo breviter exserto.

Habitat.—North Madagascar, *Rev. R. Baron*, 6366.

Folia 2–3 poll. longa, medio 12–15 lin. lata. *Involucrum* 4 lin. diam. *Petali* lamina semipollicaris.

The number of known species and genera of this natural order, which is peculiar to Madagascar, has increased rapidly of late years. The present plant is nearly allied to *S. grandiflora*, Thouars. The flowers are as large, but the involucre is bell-shaped instead of turbinate, and wants the strong vertical plications which are so conspicuous in that species.

32. **Passiflora** (§ **Granadilla**) **retipetala**, *M. T. Masters* [Passifloreæ]; foliis membranaceis glabris cordatis ovatis acuminatis, nervis lateralibus remotis ad angulos acutos e nervo medio emergentibus, petiolis glandulis sparsis 6–8 sessilibus munitis, stipulis foliaceo-membranaceis reniformibus aristatis, pedunculis 1 poll. longis 1-floris, bracteis foliaceis cordato-ovatis acutis, floribus tubo brevi cupulato, limbo patente, sepalis oblongis acutis dorso subapice corniculatis, petalis membranaceis sepalis vix brevoribus 1-nerviis nervis secundariis arcuatis reticulatim divisis, corona fauciali filamentosa filamentis extimis petalis æquilongis gracilibus patentibus filamentis interioribus dimidio brevioribus incrassatis, corona media a præcedentibus paullo distante basi tubulata membranacea superne in lacinias filamentosas dividente, corona infra mediana e tubo versus medium proferente membranacea annulari, gynandrophoro petalis dimidio breviore crassiusculo glabro supra basin angulatum annulo membranaceo deflexo exsolvente, filamentis apice planis dilatatis, ovario oblongo glabro, stylis lineari-clavatis ovario fere duplo longioribus.

Habitat.—Ad flumen Mazaruni, Guianæ Britannicæ. *Jenman*, No. 5791.

Folia 3½–4 poll. longa, 1½ poll. lata; petiolus quam lamina dimidio brevior; stipulæ 8–9 lin. longæ. *Pedunculi* 1 poll. longi; bracteæ 7–8 lin. longæ. *Flores* 2½ poll. lati.

Remarkable for the venation of the petals.

33. **Passiflora** (§ **Astrophea**) **securiclata**, *M. T. Masters* [Passifloreæ]; ramulis glabrescentibus striatis spinulosis, foliis subcoriaceis glabris oblongis acutis basi rotundatis, nervis remotiusculis ad pares angulos divergentibus arcuatis, petiolis versus apicem glandulis duabus majusculis sessilibus præditis, stipulis caducis lineari-subulatis, floribus ut videtur racemosim dispositis, ramis floriferis casu foliorum denudatis, floris tubo cylindraceo, limbo patente, sepalis carnosulis oblongis acutis, petalis sepalis fere æquilongis tenuioribus aurantiacis, coronâ fauciali 2–3 seriata filis extimis petalis dimidio brevioribus apice petaloideis dilatatis securiclatis punctatis, filis interioribus brevioribus apice clavato-incrassatis, corona media e tubo infra medium assurgente membranacea basi tubulata superne pectinato-laciniata, gynandrophoro exserto gracili basi ad angulis 5-alato, ovario oblongo apice truncato longitudinaliter costato, stylis basi remotis apice clavatis, fructu (ex icone Schomburgk, No. 32 in herb. Mus. Brit. asservat) ovoideo.

Habitat.—Ad flumen Rupununi, Guianæ Britannicæ. *Jenman*, No. 5535 "Cheenatada."

Folia circa 3¼ poll. longa, 2½ poll. lata; petiolus 7–8 lin. longus. *Floris tubus* 1¼ poll. longus, 2–3 lin. latus. *Fructus* 1½ poll. longus 6 lin. latus.

I place this species in the section *Astrophea* mainly on account of the truncated ovary. The plant appears to be of scandent habit, though

destitute of tendrils. Imperfect specimens from Roraima, gathered by Mr. Im Thurn, No. 84, probably belong to the same species.

34. **Jasminum asphanodon**, *Baker* [Oleaceæ]; sarmentosum, glabrum, foliis simplicibus breviter petiolatis ovatis acutis magnis subcoriaceis, floribus in paniculum pauciflorum corymbosam dispositis ramulis ascendentibus, calycis tubo campanulato dentibus brevissimis inconspicuis, corollæ albæ lobis 7–8 lineari-oblongis tubo vix brevioribus.

Habitat.—North Madagascar, *Rev. R. Baron*, 6229, 6237.

Folia 3–4 poll. longa, petiolo semipollicari. *Calyx* 2 lin. longus. *Corollæ* tubus 8–9 lin. longus.

Nearly allied to the well-known Australian and Polynesian *J. simplicifolium*, Forst., Bot. Mag. t. 980, *J. gracile*, Andr. Bot. Rep. t. 127, Ker in Bot. Reg. t. 606.

35. **Stachys obtusifolia**, *McOwan* [Labiatæ]; caule erecto ramoso piloso, foliis ellipticis obtusissimis crenatis inferioribus breviter petiolatis subcordatisque superioribus fere sessilibus summis demum bracteiformibus utrinque tenuiter piloso-pubescentibus, verticillastris 3–4 floris, calycibus glanduloso-pilosis dentibus breviter acuminatis, corollâ calyce subduplo longiore tubo incluso.

Habitat.—In clivis montium circa Clydesdale prope flumen Umzimvubu, Griqualand Orientalis, alt. 2,500 ped. Nov. 1884 legit *W. Tyson.—Herb. Austro-Afr.*, No. 1298; *W. Tyson*, No. 2561; Baziya, Tambukiland, *Baur*, No. 75.

Folia inferiora 12–16 lin. longa, circa 9 lin. lata; petiolus 4 lin. longus.

The plant is nearly allied to *S. sessilifolia*, E. Mey., which, however, differs in ascendent habit, conspicuously albo-villose indument, and sessile more or less ovate leaves. Dregè's specimens of the latter species from the Umzimvubu, so far as represented in the Cape Government Herbarium, are very poor. It has, however, been recently gathered by Mr. H. G. Flanagan at the Kabousie, and will be distributed hereafter.

36. **Stachys tubulosa**, *McOwan* [Labiatæ]; caule herbaceo debili pilosiusculo internodiis elongatis, foliis membranaceis ovatis basi cordatis subacutis crenato-dentatis suprà sublente distanter pilosis subtus glabriusculis, petiolis tenuibus laminam subæquantibus, verticillastris 4–6-floris, calycibus campanulatis pilosis dentibus subulatis acutis patentibus, corollæ tubo longè exserto subæquali pubescente calyce 3–4-plo. longiore.

Habitat.—In sylvis montis Malowe, prope flumen Umzimvubu, Griqualand Orientalis, alt. circa 4,000 ped. Martio 1886, legit *W. Tyson.—Herb. Austro-Afr.*, No. 1297; *W. Tyson*, No. 2549, 2153; Zuurberg, Griqualand East, *Wood*, No. 1985; Natal, *Mrs. K. Saunders.*

Folia $1\frac{1}{2}$–2 poll. longa, 1–$1\frac{3}{4}$ poll. lata. *Corollæ tubus* 9–10 lin. longa.

Leaves distinctly cordate, and, including the petioles, only half as long as the internodes of the stem; floral leaves subsessile and smaller, otherwise conformable. Tube of corolla scarcely enlarged upwards, pale purple, lower lip pencilled with dark purple veins.

37. **Leonotis laxifolia**, *McOwan* [Labiatæ]; caule herbaceo tomentulo, foliis tenuibus late ovatis acuminatis basi plus minus truncatis grosse inciso-dentatis laxis sublente solum piloso-puberulis subtus

pæne concoloribus, petiolis gracilibus folio æquilongis, calycibus subglabris dentibus spinosis supremo multo majore ovato acuminato cæteris minutis inter se æqualibus, bracteæ reflexæ lineares, corollâ calyce 3-plo. longiore.

Habitat.—In sylvis montis Malowe in ditione Griqualand Orientalis, alt. circa 4,500 ped. Martio legit *W. Tyson*, ann. 1886. *Herb. Austro-Africanum*, No. 1300; *W. Tyson*, 2766.

Folia 2½–3 poll. longa, 1¼–2 poll. lata; petiolus 1½–2 poll. longus.

Nearest to *L. intermedia*, Lindl., from which it is well distinguished by the much broader, almost triangularly ovate saturate green leaves, which are thinner, laxer, and more glabrescent than those of any other species. The armature of the calyx is less firmly spinose than that of *L. ovata*, Spr., more so than the almost unarmed *L. intermedia*, Lindl. Besides the specimens distributed from Tyson's collection, there is a characteristic example in the Cape Government Herbarium, marked "Port Natal," probably from Queinzius.

38. Achyrospermum urens, *Baker* [Labiatæ]; fruticosum, ramis foliisque pilis urentibus copiosis præditis, foliis petiolatis ovatis crenatis acutis, verticillastris dense capitatis, bracteis ovatis acutis, pedicillis brevissimis, calycis dentibus ovatis tubo brevi infundibulari brevioribus, corollæ rubræ tubo e basi ad apicem sensim ampliato lobis parvis rotundis triplo longiori, genitalibus breviter exsertis.

Habitat.—North Madagascar, *Rev. R. Baron*, 6296, 6314.

Folia 3–6 poll. longa. *Calyx* 2 lin. longus. *Corolla* 7–8 lin. longa.

This is the Labiate with stinging hairs mentioned in the Kew Bulletin, 1892, p. 150. It is a small shrub, with leaves resembling those of *Urtica dioica* and flowers like those of *Salvia coccinea*.

39. Selaginella (Heterostachys) Kunstleri, *Baker* [Selaginellaceæ]; caulibus continuis late repentibus intricatis, fibris radicalibus ad caulis apicem productis, ramis distantibus erectopatentibus, ramulis paucis brevissimis, foliis distichis plani inferioris firmulis laxe dispositis ovatis amplexicaulibus antice productis magis rotundatis, plani superioris minoribus inæquilateraliter ovatis aristatis, spicis brevibus densissimis, bracteis valde difformibus majoribus linearibus dense ciliatis minoribus ovatis cuspidatis dorso acute carinatis.

Habitat.—Larut, Perak, alt. 100–300 ft., *Dr. King's collector*, 1866.

Folia majora ¾ lin. longa. *Spicæ* 2–3 lin. longæ, interdum furcatæ.

Resembles *S. Kraussiana* in general habit. It belongs to the group *Bisulcatæ*, of which only four species were known previously. It was the only new species of *Selaginella* contained in the large set of Vascular Cryptogamia of the Malay peninsular which has been gathered lately by Dr. King's collectors.

40. Bambusa Wrayi, *Stapf.* [Gramineæ]; alte scandens, culmo superne tenuissimo nutante sæpe usque ad solum flexo inermi, internodiis flavidis glabris teretibus nitidis, foliis lineari-lanceolatis longe et angustissime accuminatis basi rotundatis lævibus glabris, nervis secundariis utrinque 7–8, vaginis striatis pallidis glabris, ligula truncata brevi pilis 3–6 lin. longis deciduis ciliata, panicula nuda vel apicem versus foliosa a basi ramosissima ramis aut abbreviatis arcte congestis verticillatis aut semiverticillatis vel elongatis, spiculis laxius dissitis vel sæpius fasciculatim congestis, fertilibus paucis, glumis gradatim increscentibus infimis 2 vacuis ovatis sequentibus 2–3 plerumque gemmiparis lanceolatis acuminatis tenuiter coriaceis opacis marginibus ciliatis, florifera rachillam tenuem elongatam

gemmulam rudimentariam gerentem æquante vel subæquante, palea submembranacea gluma sua paulo breviore superne bicarinata in carinis asperula vel ciliata in sulco dorsali rachillam productam et rudimentum recipiente, lodiculis obovatis ciliatis subæqualibus, antheris 6 glabris basi sagittatis muticis, ovario oblongo sensim in stylum brevem attenuato, stigmatibus tribus tenuis plumosis, caryopside (immatura) e basi oblonga in rostrum brevem cylindricum attenuata.

Habitat.—Mt. Gunong Inas, at the source of the Selama River and at the source of the Plus River, 4,500–5,500 ft., *L. Wray* (Perak Mus. Herb., Fl. Malay Pen., No. 4,166).

Culmus 40–60 ped. altus, basi circa 1 poll. crassus, internodio tertio vel quarto interdum ad 7 ped. longo. *Folia* 8–10 poll. longa, 10–13 lin. lata. *Panicula* a 5–8 poll. ad 3 ped. longa. *Spiculæ* 6-9 lin. longæ. *Glumæ* infimæ ad 4½ lin. longæ. *Ovarium* vix 1 lin. longum, stigmatibus 1½–2 lin. longis.

This species, like *B. Griffithiana*, Munro, is closely allied to *Nastus*, so far as the composition of the spicula is concerned. The fertile spicula begins with an empty bicarinate glume which is pressed against the relative primary axis. Then follow 1–2 empty and 2–3 mostly bud-bearing glumes which increase in size and are, except the lowermost, but indistinctly unicarinate; above these is the single fertile glume and a rudimentary bud borne by a long pedicel, a prolonged internode of the axis of the spicula. Sometimes the buds (gemmæ) grow into sterile spiculæ almost the length of the primary one. They also begin with a bicarinate glume which is followed by closely set ecarinate glumes increasing in size up to a certain point, thence decreasing. These, like all sterile spiculæ, bear in the axils of most of their glumes more or less reduced branchlets in the shape of small buds, and there is no prolonged internode in their rachilla. As all ramifications within the inflorescence begin with a bicarinate bract ("adossirtes Vorblatt," Eichler), and those bracts are all of the same shape and, as also the bracts of the other series to which the gemmiparous and the fertile glumes belong, are like each other, and only differ in size, it is often nearly impossible to distinguish the single spiculæ.

So far the composition of the spiculæ is almost the same as in *B. Griffithii*, and it approaches very much that of *Nastus*. The only deviation from the structure in the latter genus is the presence of gemmæ. The anthers, styles, and ovary are as in *B. Griffithii*. But whilst the lodiculæ in *B. Griffithii* are, according to Munro, unequal, as in *Nastus*, I find them equal, or almost so, in *B. Wrayi*. On the other hand both *B. Griffithii* and *B. Wrayi* differ from *Nastus* in the shape of the ovary, which is oblong, gradually tapering into the short style, which persists in the fruit as a cylindric beak, instead of being widened above. The glumes are coriaceous, but not so prominently nerved as in *Nastus*, and more like those of most *Bambusæ*. In habit and leaves *B. Wrayi* differs very much from *B. Griffithii*, approaching more nearly *B. arundinacea*, at least so far as herbarium specimens are concerned. If we imagine the "gemmæ" of the fertile spiculæ as being all entirely suppressed, we should have exactly the same structure as we have in *Nastus*. The step to this is hardly greater than from the many-flowered spiculæ of the majority of *Bambusæ* to the one-flowered spiculæ of *B. Griffithii*, and if we retain this in *Bambusa*, we ought, I think, to reduce *Nastus* also to *Bambusa*, where it might stand as a section or as a subgenus, distinguished by the more distinct reduction of the structure of the spiculæ, but linked very closely to the

true *Bambusæ* by *B. Wrayi* and *B. Griffithii*. From a geographical point of view it is very interesting to note that the centre of *Nastus* lies quite at the periphery of the common area of the other *Bambusæ*, in Madagascar and in the island of Bourbon, and that it just reaches Western Sumatra (Angkola, Junghuhn, according to Munro). Here in the most western part of the Malayan flora it is joined by its nearest ally, *B. Wrayi*, whilst *B. Griffithii* was found in the extreme north of Burma and in Manipur by Mr. C. B. Clarke.

Mr. *L. Wray*, jun., states that this Bamboo was only found in the two localities mentioned above. According to him it dies off after having fruited. The Lemangs call it *Buloh Bersumpitan*, and they "use the large canes for the outer case of their arrow blowpipes; the "small ones for the inner tube. They strengthen them over a fire when "green and hang them up in the smoke of their cooking places to dry."

In numerous sterile spiculæ the 4th or 5th glume was deformed by insect action. The basal portion was much enlarged and adnate to the likewise enlarged next internode of the rachilla. This portion, a kind of oblong gall, contained the larva of the insect in the cavity.

In regard to the plant described above (*Bambusa Wrayi*) the following interesting particulars respecting it are contained in a letter received at Kew from Mr. Wray, dated Perak, June 14th, 1892 :—

Mr. L. Wray, junr., to Royal Gardens, Kew.

Perak Government Museum, Larut, Perak,
Straits Settlements, June 14th, 1892.

Dear Sir,

I recently went up a mountain called Gunong Inas, in the north of this State, and procured live plants of the bamboo of which the Semangs make their blowpipes, known by the Malay name of *Buloh versumpitan*.

If these plants grow I will send them to you before the cold weather sets in. I have sent them up the hills here, where they will be at nearly the same elevation as their natural habitat.

I was also fortunate enough to find a clump of these bamboos in flower, and I send you the specimens. As I expect this is a new species, and that you will describe it, I have sent you all the specimens, as it is better to have the whole material available to describe from. I would ask you, after having kept what you require for your herbarium, to kindly send the duplicates to Dr. King, of Calcutta.

The plant grows at from 4,500 feet to nearly 6,000 feet elevation, generally on the ridges of the hills. The canes are about 1 inch in diameter near the ground, and taper away to $\frac{1}{16}$ inch. These long thin ends drop down till they touch the ground. The canes are from 40 to 60 feet long. They are furnished with whorls of leaves at all the upper joints, and, as can be imagined, the bamboo is about the most elegant of its kind. From what I saw I arrived at the conclusion that this plant having arrived at maturity, fruits and then dies. I cannot form any idea at what age this happens, but I saw a cane which had been partly cut through by a knife, and it was still in vigorous growth; and as this hill has not been visited since 1886 this particular cane must be at least six years old, and as there would be many successions of canes before a plant reaches maturity the age of these bamboos must be very considerable. When they fruit, the barren canes

die and are replaced by canes on which flowers appear at all the upper joints. I saw two dead clumps which had fruited.

The joints are often over 7 feet in length. The longest joint of a cane is generally the third or fourth from the ground. The Semangs use the large size canes for the outer case of their blow pipes, and the small ones for the inner tube. They straighten them over a fire when green, and hang them up in the smoke of their cooking places to dry.

They appear to grow in two places only in Perak. That is on the mountains at the source of the Plus River, and on the mountains at the source of the Selama River, from the latter of which localities the specimens now sent were obtained.

The parcel goes by this mail, and I hope will reach you in safety.

I am, &c.

(Signed) L. Wray.

W. T. Thiselton-Dyer, Esq., C.M.G., &c.,
Royal Gardens, Kew.

CCXCIII.—CLOVE INDUSTRY OF ZANZIBAR.

An account of the agricultural resources of the island of Zanzibar was given in the *Kew Bulletin* for April 1892, p. 87, and reference was made to a report on the same subject prepared by Sir Gerald Portal and issued by the Foreign Office (Annual Series, 1892, No. 982). Another report has now been issued by the Foreign Office on the "Spice and other cultivation of Zanzibar and Pemba Islands," prepared for Sir Gerald Porter by Mr. FitzGerald, a specialist on tropical agriculture in the employment of the Imperial British East Africa Company.* From this latter report the following extract is taken respecting the clove industry of Zanzibar and Pemba.

The clove is undoubtedly the principal and most important cultivation of Zanzibar, and grown, wherever the soil is suitable, from the large and extensive plantations belonging to the Sultan and his family to the few trees owned by the more humble cultivator.

The soil of Zanzibar, with the exception, however, of that of Pemba, which excels it in this respect, is certainly eminently adapted for this cultivation. The soil most suitable for clove cultivation is "a dark "loam, having underneath a layer of dusky yellow earth, intermixed with "gravel;" also "a yellowish or reddish stiff clay;" and these typical soils are all found on the island. The clove tree requires clay, and I observed there was always a marked difference in appearance between trees growing on a clay soil—red for preference—and those found on a lighter ground; and the finest trees were always either growing on red clay, or else a stiff dark red to darker chocolate soil.

The clove tree (*Caryophyllus aromaticus*) is a native of the Moluccas, and was introduced into Mauritius in 1770 by the French, and at the end of the century an Arab, by name Harameli-bin-Saleh, accompanied a French officer from Zanzibar to Bourbon and obtained permission to take back a small quantity of seeds and plants with him. This was the commencement of clove cultivation in Zanzibar, Harameli making the first plantation at Mitoni, on the road to Chueni; and the cultivation rapidly spread. The different methods by which this cultivation is now

* Foreign Office, 1892, Miscellaneous Series, No. 266, Zanzibar. Price Fourpence.

carried on are evidently borrowed from the French, and the Swahili word for clove, "garafu," is probably a corruption of the French word "giroflier."

Nurseries.

The seeds are first soaked in water for three days, and when germination has set in they are planted out 6 inches apart, with the bud end above ground, into shaded beds—the usual practice being to put down two seeds together in case of failure. If a large number of plants are to be grown the seeds are only put down 3 inches to 4 inches apart.

Beds are about 6 feet wide, and of any length. They are shaded by a flat framework of sticks, over which is placed a layer of either dry grass or cocoanut leaves; the height of this framework is about 3 feet to 3½ feet.

There is no regular rule for watering the seedlings, the important point being to keep the beds constanty damp. The slaves in charge go over the nursery beds both morning and evening, watering any of which the surface has become dry, the practice being to sprinkle water with the hand from the water jar. The plants are kept, on an average, from nine months to one year in shaded beds. When the plants are about 6 inches high they are by degrees hardened by the thatch of the framework being gradually removed, and they are then left in the open beds freely exposed to sunshine for the space of one month or two months before planting out.

Planting.

The usual planting distances appear to vary, and no regular or fixed rules appear to exist.

The most customary, as given to me by Ragu, the head overseer of the Sultan's plantations, is 24 feet apart, but also in small plantations it is 18 feet, rising in larger ones to 36 feet.

Lining is done by rope, but no pegs are used, the distances being marked by a cut with the hoe. This work is very carefully carried out, and the appearance of the majority of plantations is very striking in this respect, whichever way one looks the trees presenting an unbroken and uniform straight line.

The process of holing is as follows:—A large circular sloping hole, 4 feet in diameter, is cut, in the centre of which is cut a smaller hole, 1 foot by 1 foot or 9 inches wide; this smaller hole receives the plant; the wide upper portion remains unfilled, and serves as a catch drain or reservoir. This is in process of time gradually filled up by weeds, fallen leaves, &c.

Special care is also taken in planting out. The earth round the plant is loosened by a peculiar triangular-shaped spade used especially on clove plantations, and called "moaa," and in use in Zanzibar, as well as the ordinary native "jembe," or hoe, already referred to.

The plant is then carefully lifted out by the hand with as much earth adhering to the roots as possible, and placed upon two strips of banana fibre previously placed crosswise upon the ground. (Each strip of fibre is about 3 inches to 4 inches wide, by 1½ feet to 2 feet in length.) The four ends are then taken up and wrapped round the plant and firmly tied together. The plant is then carried to its destination, the strips of fibre effectually keeping the earth in position. Before planting, the pieces of fibre passing beneath are cut at each corner, and the plant finally placed in the hole prepared for it and the earth heaped round; the four ends of the fibre left at the sides are then removed one by one, the bottom portion being cut through enabling this to be done with ease.

If the weather is hot, or in the event of drought, the young plant is watered in the evening daily, and watering is continued as required until the plant attains the height of 18 inches, or, roughly speaking, during the space of one year. The young plants are not shaded in any way after planting.

Age of Trees.

There are some trees now growing on the island which are said to be nearly 90 years of age, but the average length of life of the clove tree in Zanzibar appears to be from 60 years to 70 years, and I have this on the authority of Mahomed-bin-Saif Drumiki, an elderly Arab of much experience, and who has been for over 20 years in charge of the Sultan's plantation at Indo. Such terrible devastation resulted from the great hurricane of 1872, when nearly all the clove plantations on the island were destroyed, that the average age of the trees now growing may be put down as below 20 years, and the age of the trees in the Sultan's plantation, the largest in the island, is from 16 years to 17 years.

The appearance of the clove plantations is, as a rule, most healthy and luxuriant, the height of the more matured trees averaging fully 40 feet, and the branches of the two rows often completely shading the ground. Clove trees generally have forked stems, and often as many as three and four. A single-boled tree is the exception.

Diseases and Enemies.

So far as I have been able to ascertain, and I have made careful inquiries on this subject, the clove tree is not subject to any fungoid disease, and the per-centage of dead, dying, and unhealthy trees noticed by me was very small, and the cause generally was either a damp situation, or else want of cultivation.

The clove tree, however, suffers from the attacks of two enemies :— one, a caterpillar, which attacks the foliage in the dry weather and often denudes the tree of its leaves, but the tree recovers at once as soon as the rains set in. The other is the white ant, which occasionally attacks the roots. No remedial measures appear to be taken.

Time of Bearing.

Clove trees begin to yield, in good situations, 5 years from planting ; in inferior soil, 6 years to 6½ years from planting.

Mohamed-bin-Saif, the overseer of Indo, informed me that he remembered trees destroyed by the hurricane of 1872, which singly yielded 5 frasilas each (175 lbs.).* Also the head overseer of the Sultan's plantations has furnished me with the following averages :— three trees will yield 2 frasilas ; 4,000 trees, 50 frasilas.

Time of Gathering.

The picking of the buds commences in August and lasts for four months, and on an average each tree is picked three times in a season. The unexpanded buds on the trees are at first a pinkish yellow, becoming a deeper red as they mature. The stalks and buds are gathered at the same time, and thrown on to grass mats spread on the ground ; the picking of the higher branches is done by means of triangular bamboo ladders.

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* 1 frasila = 35 lbs.

Curing.

Other slaves pick off the buds from the stalks, and they are then spread out to dry in the sun, being taken in every night. The cloves are dried on mats in direct sunlight. The drying is continued for the space of 6 days or one week.

Green cloves dry down to about half their weight; thus 1 frasila, green, is equal to ½ frasila, dry. The colour desired in the dry clove is red; and buds of this colour are more valued than black.

Cloves are dispatched to Zanzibar in gunny bags. There is a duty due to Government of 25 per cent.; this is paid in kind, and the cloves heaped in bulk in the Government godowns. Public auctions of this are now held by Government every fortnight to allow open competition, and especially to admit European merchants. Zanzibar cloves are very dry, differing much in this respect from the Pemba produce. Zanzibar cloves can be stored for some time, but Pembas are disposed of as early as possible, as otherwise the loss from "shortage" is very great.

A good dry sample of Pemba cloves is smaller and blacker—blacker from having contained much moisture. Zanzibar cloves are larger, and the red appearance of the dried buds is unmistakeable, and they are well-known as "Zanzibar red-heads."

Shipment.

Cloves are generally exported in double mat-bags ("makanda") in preference to gunnies, though there is more shortage—in fact, the difference is marked; though double, the mat-bags apparently permit a greater absorption of damp. The difference of shortage between Zanzibar and Europe in the weight of the cloves equals 8 per cent. The difference between Zanzibar and Pemba cloves is well recognised in Europe, but large shipments of both varieties are also made to Bombay, where they are very probably mixed. Also large exports of clove-stalks are made to both Bombay and New York.

The exports of cloves from Zanzibar and Pemba for 1890–91 were as follows:—1890, 17,881,850 pounds avoir.; 1891, 13,615,105 pounds avoir.

At the present time Zanzibar unfortunately holds the lowest position in the London market as regards prices. I annex quotations of sales from the London produce market reports of May 13, 1892:—"77 packages Amboyna at $3\frac{3}{8}d.$ to $3\frac{1}{2}d.$ 388 bales Zanzibar (part "sold) at $2\frac{5}{8}d.$ to $2\frac{3}{4}d.$ Most of the 38 cases Penang sold privately, "with a few lots in sale at 1*s.* to 1*s.* $0\frac{3}{4}d.$"

CCXCIV.—MISCELLANEOUS NOTES.

Appointment.—Mr. Thomas Humphreys, Arboretum Propagator at the Royal Gardens, has been appointed Assistant Superintendent of the Royal Horticultural Society's Gardens at Chiswick.

Velloziæ.—The two genera *Vellozia* and *Barbacenia*, of which this tribe of *Amaryllideæ* is composed, are very poorly represented in cultivation, although they are plants of exceptional interest and decidedly ornamental in character. Altogether there are about 70 species in

the two genera, all natives of South America, Africa, and Madagascar. At Kew the following only are represented by living examples, viz.:—*Vellozia elegans* and *V. retinervis*, *Barbacenia candida*, *B. squamata*, *B. purpurea*, and two unnamed Vellozias. We are indebted to Mr. R. Templeman, of Cape Town, for stems of *V. retinervis*, and also to Mr. E. Galpin, of the Transvaal, for good seeds of this species. Mr. Templeman writes:—"The Vellozias were collected by me in the Transvaal at a place about 40 miles from Pretoria, in very dry situations, where the winter is cold and there is no rain from March to October." Mr. Galpin described the plant as "subarborescent, branching, the stem 3–4 inches in diameter and 1½–2½ feet high. It is surmounted by a tuft of hard grass-like ribbed leaves, amongst which spring the single-flowered peduncles, of which each stem will bear a dozen or more. The flowers are handsome, lilac in colour, and sweet scented." In a note on this species published in the *Gardeners' Chronicle* in 1876 (vol. vi., p. 837) the stem is described as being 12 feet high by 4 inches in diameter, and the leaves 5 feet in length. *Vellozia elegans* and *Barbacenia purpurea* are old garden plants. *B. candida* and *B. squamata* have recently been introduced to this country from Brazil. The arborescent species may be described in a general way as having stems like *Cordyline*, leaves like *Pandanus*, and with large campanulate white, blue, or violet flowers.

Melon Pear.—Under the name of Melon Pear or Pepino a Solanaceous plant was introduced to this country a few years ago and grown experimentally both at Kew and at the Royal Horticultural Society's Gardens at Chiswick. The stem was slightly woody at the base, but it had a loose bushy or scrambling habit indicating that it might become a weak climber, and so suggest the name of "vine" given to it in America. The fruit was somewhat egg-shaped, about 3 to 5 inches long, and having very much the appearance as well as the texture of a papaw fruit. The plant was received here as *Solanum guatemalense*, but as this name could not be traced it was evidently only a garden name. The correct name is *Solanum muricatum*, Ait., and it is apparently a native of Peru. As long ago as 1714 Feuillée described and figured it in his *Journal des Observations*, Vol. 2, pl. 26. He stated that in taste it closely resembled the ordinary melon. It has recently been figured as *Solanum muricatum* in *Garden and Forest*, April 13th, 1892 (Fig. 26). There appears to be considerable difference of opinion as regards the value of the fruit. Grown under glass in this country it was decidedly an inferior fruit, and the Fruit Committee of the Royal Horticultural Society was of the same opinion. It had a mawkish insipid taste rendering it quite unsuitable as a dessert fruit. On the other hand it appears to be regarded in California as possessing refreshing properties, and to be little inferior to a good melon. A writer in the *American Orchard and Garden* quoted in the *Gardener's Chronicle*, April 21st, 1888, is of opinion that "there is no fruit in the tropics or semi-tropics which so readily allays thirst as the Pepino. When properly grown it contains, beside the sugar, an acid of the most refreshing and remarkable kind. A single ripe Pepino will allay thirst for several hours even in the hottest weather. If grown under too much heat this acid is more or less wanting, and the Pepino becomes worthless or insipid, and resembles then simply an inferior Musk Melon." It is possible that in the peculiar climate of mountainous districts in the

tropics the Melon Pear may prove useful. It probably requires similar conditions to such sub-tropical plants as the Tree Tomato (*Cyphomandra betacea*), the Chocho (*Sechium edule*), and the Cherimoyer (*Anona Cherimolia*) described in the *Kew Bulletin* for August 1887.

Attar of Roses.—It is well known that the great centre of the production of Attar, or Otto, of roses occupies the northern portion of the old Turkish province of Eastern Roumelia. The cultivation of roses for this purpose is, however, limited to the southern slopes of the Great Balkans, as the flowers are nowhere produced successfully on the north. The distillation of the petals is carried on in a very primitive manner with a copper still of the simplest construction. The first runnings are returned to the still and the second are received into glass flasks, where they are kept for a day or two at a cool temperature to allow the oil to rise to the surface. From the latter it is skimmed by a small tin pipette or funnel, with a long slender handle attached to the top and a very small aperture at the lower pointed end. This funnel is not more than $\frac{3}{4}$-inch diameter at the widest part, so that it is easily inserted into the flask, and plunged below between the oily layer and the water. It is then at once brought up, and it brings with it a portion of the oily stratum with a small quantity of water. The water escapes through the small hole at the bottom, while the oil or otto is emptied into the collecting flasks. For exportation the commercial attar is transferred to flat circular zinc receptacles known as "coppers," which are carefully sewn up in white felt and sealed with the exporter's stamp, the brand being also stencilled on the felt outside. Two of these "coppers," one covered with the felt, and the other without, are contained in the Museums of Economic Botany at Kew, and to these Messrs. Piesse and Lubin have now courteously added a specimen of the pipette or funnel for the purpose of making the collection more complete. As regards the identification of the plants cultivated for Attar of Roses, it may be useful to mention that in 1874 the late Mr. Daniel Hanbury, F.R.S., presented to the Kew Herbarium specimens of "Roses cultivated on the slopes of the Balkan for the production of Attar of Roses," received from Mr. Vice-Consul Dupuis of Adrianople. These contained specimens of two species, a red rose (*R. damascena*, Miller), and a white rose (*R. alba*, L.). Neither of these is known in a wild state, and there can be little doubt that both are hybrids between *R. gallica* and *R. canina*. The subject is more fully discussed in *Pharmacographia* (1879), p. 262.

Gift of rare and valuable Books.—Mr. Thomas Hanbury, F.L.S., of La Mortola, Italy, has presented to Kew a selection of about 30 volumes, in memory of his brother, the late Daniel Hanbury, F.R.S. (part of whose library they formed) an accomplished botanist, who successfully devoted himself to the investigation of the sources of vegetable drugs. He published, in conjunction with Prof. Flückiger, of Strassburg, "Pharmacographia," which will long remain the standard and classical authority on the history of drugs. The portion of his library now acquired by Kew is of especial interest as having been used by him in the preparation of his book. Most of the books treat of economic or medical botany, and several of them are of very early date. A fifteenth century translation of an Arabian author (Serapion) on medicinal plants

is of special value. As Meyer states (Geschichte der Botanik, iii. p. 235), the translation is in atrocious Latin, abounding in elisions and abbreviations. There is no separate title-page, the title being at the head of the first column, the whole work being beautifully printed in double columns, on paper of admirable quality. It runs :—

> Liber Serapionis Agre
> gatus ī medicīis simplicib' Trāsla-
> tō Symōis Ianūesis interpte Abraā
> iudeo tortuosiēsi de arabico ī latinū
> Inquit Serapion.

This first edition was printed at Milan, as recorded at the end :— Opus Impressum Ml'i Per Antūium Zarotum Parmēsem Anno domini Mcccclxxiii Die Mercurī iiii August. There were several editions, but the first appears to be exceedingly rare. Indeed, neither Pritzel nor Dryander mentions it. Dryander (Cat. Bibl. Banks., i. p. 277) enumerates only a Venetian edition of 1552. Pritzel gives only the Brunfel's edition, published at Strassburg in 1531. This, according to Meyer, is the edition usually cited, as it is easier to read and has an index, which is wanting in previous editions. The first edition is a small folio of 370 pages, not numbered; and the sheets have no signatures, and the pages no catchwords, so that it is difficult to ascertain whether the sheets are arranged in proper order.

"Das Destillier Buch das Buoch der rechten Kunst zu distilliren," a curious book in this collection, first appeared in 1500, and again in 1505, under a somewhat different title; and another edition was published in 1512. The edition in the Hanbury gift was printed in 1515. The title-page and part of the preface are wanting in this copy, and here and there a leaf is imperfect, otherwise it is in excellent condition. Appended to the foregoing is "Das buoch des lebens Marsilius Ficinus von Florenz "zu dem gesunden und langem leben der rechtē arzneien von latin erst "nüw zü tütsch gemacht." At the end is the following record :— Gedruckt vnd vollendet ist diss loblich werck zu Strassburg durch Johānem Grüninger off sāt Adolffs tag. Imiar MDXV. Concerning the 1505 edition of this work Pritzel (Thesaurus Literaturæ Botanicæ, ed. 1, n. 4457) says :—In præfatione auctor de se ipso haec scribit: "Ich "*Hieronymus Brunschwyg*, des geschlechts *Salern*, bürtig von Strass- "burgk." De vita autoris, qui *Brunschwick*, *Brunsvigius*, *Brunsvicensis*, *Brunschwig*, *Brunschwyg*, *Braunschweig* variis varie audit literatoribus, nihil certi constat. Ejus liber innumeris redit impressus vicibus, praesertim cum *Marsilii Ficini* Buch des Lebens "als er an im selb bewert und hundert und zehen jar rüwiglichen gelebet hat." The woodcuts representing the plants described in the first part are mostly very rude; but the scenic illustrations of the second part are excellent specimens of the art. The figures of persons are especially good. According to Treviranus (Die Anwendung des Holzschnittes zur bildlichen Darstellung von Pflanzen, p. 6), the figures of plants are all taken from the "Ortus Sanitatis."

Another very interesting book in this collection is "The Treasury of "Evonymus, conteyninge the wonderfull hid secrets of nature . . . ". . . . Translated (with great diligence and laboure) out of latin, "by Peter Morwyng felow of Magdaline Colleadge in Oxford." Imprinted at London by John Daie, dwelling over Aldersgate, beneath Saint Martines. "Cum privilegio ad imprimendum solum." The book opens with an address by John Daye "to the Christian Reader," dated 1559. This book is a translation of Conrad Gesner's "Thesaurus

de Remediis Secretis," Lugduni, 1555. It is illustrated by neat little woodcuts mostly recognisable, though sometimes oddly named; and the same cut is sometimes made to do duty for two or three different things. Thus, the figure representing "*Fraxinus*" is repeated under "*Tilia*."

Araucaria imbricata.—A tree of considerable historic interest died last autumn in the Kew Collections. It stood on lawn L. on the south-west corner of $\frac{8}{D}$ in the Key Plan. It was the oldest specimen of the Chili pine existing in this country, and for many years, before the species became so common as it is at present, it was regarded, according to Scheer, as "the lion of the gardens." It had had an eventful career, and for many years what was once "a superb tree" had lingered on as mere historic curiosity. The following account of it was given in the *Kew Bulletin*, 1891, pp. 299–300 :—

Menzies introduced the now well-known *Araucaria imbricata*. Smith (Records, p. 287) tells the story :—

"At a dinner given by the Viceroy of Chili to the captain and officers of the ship part of the dessert consisted of nuts which Menzies (who was a good botanist) had not before seen. Instead of eating all his share, he took some with him on board, and having obtained a box of earth, planted them, when they sprouted, and he succeeded in bringing five plants to England, which were safely received at Kew. . . . In 1833 King William IV. presented one to Lady Granville for her collection at Dropmore. It was then about 5 feet high, growing in a tub; it is now (1880) a fine tree 60 feet high; this is, however, much inferior to another plant at Dropmore, said to be the produce of a cutting stolen by a lady from the original plant at Kew nearly 50 years ago."

According to Loudon (Arboretum, vol. iv., pp. 2435–6) :—

"Menzies . . . . brought home living plants, which he presented to Sir Joseph Banks, who planted one of them in his own garden at Spring Grove, and sent the others to Kew. From this circumstance the tree was called at first in England Sir Joseph Banks's pine. The tree at Kew was kept in the greenhouse till 1806 or 1808, when it was planted out where it now stands by Mr. McNab, the present (1838) superintendent of the Edinburgh Botanic Garden. After it was planted out, not being considered quite hardy, it was protected during winter with a temporary frame, covered with mats; and having become habituated to this mode of treatment, it has been considered unsafe to leave it off."

The unfortunate tree seems always to have had a bad time. Neill, writing in 1817 (Horticultural Tour, p. 77), says :—

"The most magnificent specimen of Chili pine (*Araucaria imbricata*) at Kew Gardens was irretrievably injured by its presence at a single gala at Carlton House, owing to the servants having very imprudently attached lamps to the branches of the tree."

Scheer, writing in 1840 (pp. 41, 42), refers to the original specimen of *Araucaria imbricata*.

"Still the lion of the gardens, King William, who, in his frequent visits to Kew, never omitted going over the Botanic Gardens, and latterly, when walking became inconvenient, drove through them in a pony phaeton, and at all events looked into every house, delighted to point out this superb tree to such strangers as might be with him."

It is anything but a "superb tree" now, and only lingers on as a historic curiosity.

Liberian Coffee.—After a long period of stagnation, the cultivation of Liberian coffee (*Coffea liberica*) is likely to become more general. This coffee is a native of the West Coast of Africa, the plant attains the dimensions of a tree, and it will grow in the lowlands in the tropics where the more heat and moisture it receives, the better it thrives. It will also grow in certain localities up to about one thousand feet elevation; but it is not suitable for cultivation on such high mountain slopes as are found so advantageous for the ordinary coffee (*Coffea arabica*). Particulars respecting the cultivation of Liberian coffee have been given in the *Kew Bulletin* (1888, p. 261; 1890, pp. 107 and 245); and latterly in the number for November last, pp. 272–282, it was shown from results obtained in the Straits Settlements that a gross return, over a wide area, at the rate of 42*l.* to 52*l.* per acre could be realised. In the West India Islands and other colonies in tropical America, where the coffee leaf disease has not yet appeared, the prospects of planting enterprise in Liberian coffee are promising. Even where the leaf disease is present, as in Java, Liberian coffee is found with present prices to be a very remunerative industry. In a report by the United States Consul on the trade of Java for 1891 it is stated that "The "cultivation of Liberian coffee has this year again attracted consider- "able attention, and if the planting of this description continues at the "present rate, the production in a few years will be a very important "one. Owing to the high prices which consignments of Liberia have "commanded, and the low rates which have ruled for tea, some planters "are gradually abandoning the cultivation of the latter in favour of "the former."

Beefwood Trees in West Africa.—In a note in the *Kew Bulletin* for 1892, p. 73, attention was drawn to the great value of the Beefwood Tree (*Casuarina equisetifolia*, Forst.) for planting on sandy shores in tropical countries. At the request of the Government of Lagos, considerable trouble was taken at Kew to obtain seed of this tree from Madras for distribution to West Africa. In a report on the sanitary condition of Lagos in 1891 Dr. Rowland states:—"Another tree which "has been planted on the Embankment is the Beefwood (*Casuarina "equisetifolia*), which is of very rapid growth and seems to prefer "a sandy and saltish soil. This tree might be advantageously cultivated "on the borders of the swamps where the Eucalyptus would not "succeed. A large number of these trees were planted around the "race course, but owing to negligence nearly all have died. The trees "on the Embankment are loaded with fruit so that they can now be "multiplied to any extent." In a despatch from Sir W. Brandford Griffith, K.C.M.G., Governor of the Gold Coast, dated 16th September 1892, it is stated:—"It will be seen that at the present time there are "at the Botanical Station about 5,000 young plants of the Beefwood "Tree on hand. It is proposed to put them into bamboo pots, so that "they may be ready for distribution and planting at the commencement "of the rainy season. The Curator states that he will then have 10,000

" plants ready for transplanting into permanent places, when care will " be taken to have them distributed to suitable localities." The results from the Gambia and Sierra Leone are so far disappointing. This is owing to the fact that, in the absence of a Botanical Station, there is evidently no one possessing the requisite knowledge to undertake the work of raising seedlings and of caring for them until they are ready to be planted out.

British Fungus Flora.—Mr. G. Massee has published the first volume of a new synopsis of all the fungi hitherto detected in Great Britain. This volume contains the first part of the Basidiomycetes, including the genera *Lycoperdon*, *Boletus* and *Polyporus*, and the *Agaricineæ*. It is wholly in English, and, in addition to the descriptions, critical notes by various authors are given under many of the species. Spore measurements are given of all the type or authentic species in the Kew Herbarium. It is twenty-one years since a complete British Mycological Flora was published, namely Cooke's "Handbook," and during that period the number of known British fungi has been nearly doubled. That work contained 2,810 species, and Mr. Massee estimates the present number at 4,895, so that a new work is very much needed. In fact, students of mycology in this country have been at a standstill from the want of a complete synopsis.